HOW TO LEVERAGE CORPORATE SUSTAINABILITY RATINGS TO DRIVE REDUCTIONS IN GREENHOUSE GAS EMISSIONS: A POLICY PROPOSAL FOR THE NEXT U.S. ADMINISTRATION

by
Hoyt Brian Yee

A capstone submitted to Johns Hopkins University in conformity with the requirements for the degree of Master of Science in Energy Policy and Climate

Baltimore, Maryland
December 2020

EXECUTIVE SUMMARY

For decades oil and gas corporations have been major contributors to global warming and its harmful effects on the environment and economy. Yet global efforts to hold these and other carbon-intensive companies accountable and pressure them to reduce their greenhouse gas emissions (GHGs) have so far been ineffective. Corporate environmental, social, and governance (ESG) ratings have the potential to help drive down GHG emissions, by measuring and comparing how different companies are managing their impact on the environment. ESG ratings have existed over 20 years and are a thriving niche in the financial services sector, but their lack of consistency and credibility have limited their influence. With some modifications, ESG ratings could help hold companies accountable for their environmental performance, similarly to how corporate credit ratings hold companies accountable for their creditworthiness.

The contribution of this paper is a proposal for strengthening existing ESG ratings through standardization, regulation, and greater focus on GHG emissions. The proposal draws on elements of the corporate credit rating system and related financial regulations. The goal of the proposal is to establish a rating framework that would increase transparency and accountability regarding corporate GHG emissions and other impacts on the environment. Such a framework would clearly identify environmental leaders and laggards for investors, who could direct their capital accordingly. As a result, corporations would have incentive to adopt more sustainable business strategies and practices to earn favorable ratings and retain access to capital.

There would likely be resistance to the proposed framework from fossil fuel producers, existing ESG rating providers, and possibly from the current U.S. Security and Exchange Commission.

The proposal has on its side, however, converging scientific, financial, and political trends, including: 1) the steady rise of global temperatures; 2) increasing demand by investors representing trillions of dollars in assets for more information about how corporations are managing climate risk; 3) reinvigorated climate action under the new U.S. administration. The proposed framework is intended to supplement other, more substantial contributions to global efforts to achieve Paris Agreement targets and prevent global warming from reaching crisis levels.

ACKNOWLEDGEMENTS

I would like to thank my thesis mentor, Dr. Liam Phelan, for his invaluable expertise, encouragement, and humor, and for helping me turn a “dog’s breakfast” of a paper into a low-carb entrée almost fit for human consumption.

I am also grateful to Energy Policy and Climate Program Director, Dr. Daniel Zachary, for his helpful and generous advice, guidance, and patience throughout my time in the program.

CONTENTS

INTRODUCTION

Greenhouse gas emissions and global warming continue to rise

The United States and 193 other countries have signed the 2015 UN/Paris Climate Agreement, which set widely-accepted targets and guidelines for halting global warming before it reaches catastrophic levels (IPCC, 2018). With greenhouse gas emissions still rising, 2020 is on course to be one of the three hottest years on record, despite the pandemic and resulting global recession (WMO, 2020). The UN Environment Program estimates that fossil fuel production would have to decrease by 6% per year to align with Paris, but instead as of December 2020 it was projected to increase by 2% per year through 2030 (Galey, 2020).

Could investors and the market help drive down emissions?

While fossil fuel production will likely remain profitable and in demand for decades to come (EIA, 2019), its adverse impacts on the environment are creating rising financial risk, including for oil and gas companies and investors. Investors seeking to reduce risk are therefore pressing publicly traded corporations to adopt more environmentally friendly practices, by directing capital away from major polluters and towards companies committed to sustainable business practices (WEF, 2020). Institutional investors representing over $80 trillion in assets have committed to incorporate environmental factors in investment decisions (PRI, 2020). The results of such investor pressure have been mixed. On one hand, over 12,000 companies, including oil and gas producers, have signed the UN Global Compact, which commits firms to promote greater environmental responsibility (UN Global Compact, n.d.). Major oil and gas companies have declared their support for Paris targets and made voluntary commitments to reduce their carbon

intensity accordingly (OGCI, 2020). Such investor pressure may have contributed to Exxon's decline in market value from $450 billion in 2013 to $180 billion in 2020, and to the once largest company in the world being dropped from the Dow Jones Industrial Average (Langley, 2020). On the other hand, none of the oil and gas majors has committed to an absolute reduction in emissions, none is on a Paris-compatible pathway, and none appears to have a clear strategy in place for meeting their announced commitments (Coffin, 2020; Wang, 2018; Global Carbon Project, 2019). Oil and gas companies instead continue to pursue investments, operations, and sales that are far from Paris-compatible (Coffin, 2020). Exxon Mobil, for example, has never committed to reduce emissions or reach carbon neutrality by a certain date, and its most recent business plan will result in a 17% increase in GHG emissions by 2025 (Crowley, 2020).

The need for more transparency and accountability

Fossil fuel producers continue to explore, extract, produce, and sell oil and gas partly because of ongoing demand but also because investor pressure has yet to reach a level sufficient to convince producers to change their business strategies. To be more convincing, investor pressure needs to be more targeted, so that it consistently punishes environmental laggards and rewards leaders. To focus and leverage their pressure, however, investors need 1) clear information about how companies are managing their GHG emissions relative to peers and 2) an effective global framework for holding oil and gas companies accountable for their emissions. Both requirements are currently lacking. Companies are not obliged to inform the public fully about their emissions, let alone reduce them. There is no effective global accountability framework. Consequently, companies can produce and sell as much fossil fuels as the market will bear, flout Paris targets, and pledge reductions without having to implement them. Coercive measures such as legal action against corporations or financers are costly and time-consuming and have not yet produced

significant change (Sarlieve, 2020). Policy measures such as the EU's emissions trading scheme or carbon taxes create incentives for companies to shift away from fossil fuels towards lower emission energy sources, but such initiatives are costly to administer, politically controversial, and require legislation so far unattainable in the U.S. Congress (Timmons, 2015).

A less costly and controversial approach to incentivize the shift away from fossil fuels would be to create a market-based framework for holding corporations accountable for their GHG emissions. The framework would 1) provide detailed information about how each company is managing its current and projected emissions as well as other environmental impacts, and 2) rate and compare how companies within a given sector, e.g. oil and gas, are performing with respect to emissions and other environmental indicators. Investors, climate advocates, and policymakers would be able to use the framework to identify and target environmental leaders and laggards more systematically, and to direct investment capital accordingly. As investor decisions increasingly favor companies that manage climate risks and impacts well (and shun companies that do it poorly), there would be competitive pressure on fossil fuel companies to literally clean up their act, including by reducing their emissions. The combination of transparency (actionable information on each company's emissions performance) and consequences (investor decisions based on that information) would provide accountability and incentives for change that are currently lacking. Once corporations realized that the rating framework is guiding investor decisions, they would be motivated to secure good ratings, including by improving environmental performance.

A new accountability framework based on corporate ESG and credit ratings

Establishment of a new ESG framework would not start from a blank slate, but instead build on existing environmental, social, and governance (ESG) ratings. The new framework would use existing ESG rating agencies and practices as a foundation and add three key features lacking in the current ESG space: 1) standardized criteria and methods; 2) comprehensive and detailed information about companies' GHG emissions; 3) government oversight and regulation. It would also draw on elements of the credit rating system, including how it is regulated. The new framework would also incorporate recommendations of the Sustainability Accounting Standards Board (SASB) (SASB, 2016) and the Task Force on Climate-related Financial Disclosures (TCFD) (TCFD, 2020), and the Global Reporting Initiative (GRI) for guidelines on which criteria rating agencies should use and what information rated companies should disclose in order to facilitate accurate, complete ratings.

Current ESG ratings are already a common source of information for investors about how corporations are managing their impact on the environment, but they are not sufficiently credible or consistent to serve as an authoritative framework of ESG accountability. The main deficiency of current ESG ratings is their lack of standardization. There are over a hundred ESG rating services and data providers (Holger, 2020), each using different methodologies and criteria for rating a company's environmental, social, and corporate governance performance. There is consequently a wide range of results, and it is unclear which ones, if any, accurately represent the relative performance of companies within a particular sector. Without a clear picture of which companies are leading or trailing based on environmental criteria, e.g. on managing GHG emissions, it is difficult for investors to assess the relative risk of investing in one firm or another and to direct their capital accordingly.

Current ESG ratings also place insufficient emphasis or weighting on GHG emissions, which are the single most significant indicator of a company's contribution to global warming (IPCC, 2018). This is likely at least partly due to the shortage of comprehensive data about corporate GHG emissions, as well as the absence of regulation requiring companies to disclose their emissions (Heap, 2020). Lacking necessary standards, emphasis on GHG emissions, data, and regulatory support, the current ratings fail to provide investors a reliable basis on which to make informed climate risk-driven investment decisions (Almono et al., 2019). A standardized, consistent ESG rating framework would reveal high- and low-performers, allowing investors, advocates, media, and policymakers to hold them accountable in their respective domains. Conversely, companies ranked among their peers within an authoritative ESG rating framework would have added competitive incentive to improve their ESG performance and attain a higher score, including by transitioning to more sustainable business strategies and practices.

Research goal

The goal of my research was to identify a practical, low-cost, relatively non-controversial way to create such a framework (for holding companies accountable for their impact on the environment and motivate them to reduce their GHG emissions). The Methodology section of this paper describes my review of literature on relevant accountability frameworks, i.e. corporate ESG and credit ratings, and how they could be supplemented and modified into a more effective approach. The results section shares my findings on what such a modified approach would look like, and the discussion section provides recommendations on how to implement it. The contribution of this paper is a policy proposal for a market-based framework of accountability that would increase competitive pressure on fossil fuel producers to reduce their GHG emissions. The proposed

framework would be based on current ESG rating methods and metrics as well as elements of the corporate credit rating system.

METHODOLOGY

My research project had three parts: The first part is a review of literature on ESG rating practices and how effective they are at motivating oil and gas corporations to adopt more environmentally friendly business practices. ESG or sustainability ratings have been produced by reputable firms and widely used by major investors for decades, but the impact of ratings on the rated corporations is unclear. I looked for evidence of impact and what might limit or enhance it, and whether ratings could serve as a tool for focusing investor pressure on major polluters. The second part of my research compared ESG ratings with corporate credit ratings, including their organizational features, influence, and how they are regulated. I explored why, despite superficial similarities, ESG and credit ratings are in different leagues in terms of their reliability and influence. Thirdly, I drew on elements from both ESG ratings and credit ratings to craft a proposal for a new ESG framework for holding corporations accountable for their emissions and motivating them to adopt more sustainable technologies and practices.

Assessing existing ESG ratings

Research for this paper included a review of scholarly, business, and government publications on the effectiveness of existing ESG ratings and rating practices in influencing corporate behavior, e.g. to reduce GHG emissions. This included reviewing the history of ESG ratings and how they work, their effects on investor decision-making and rated companies, limitations on the effectiveness of the ratings, and possible ways to overcome these limitations. The focus of the paper is on global warming and how to motivate companies to help mitigate it. I therefore

concentrated almost exclusively on the "E" of ESG ratings, and more specifically on GHG emissions. I chose to study ESG ratings because of their increasing popularity in the investment community; apparent potential to influence investors, markets, and corporations; staying power; and accessibility online. While there are dozens of ESG rating/data providers and research services, I confined my research to the largest and most prominent firms with a global perspective, since information about them was most accessible and presumably representative of the overall group's strengths, weaknesses and potential.

Comparing ESG ratings with credit ratings: in search of an alternative model

I researched differences and commonalities between ESG ratings and a more stablished, more influential rating system, i.e. corporate credit ratings. I reviewed academic and trade literature for explanations of why credit ratings are more consistent and impactful than ESG ratings, and whether the key differences lie with the respective rating processes, producers, consumers, oversight and/or other factors. I also reviewed regulatory decisions and trends relevant to the credit rating system and the ESG space, and considered the scope for reinforcing ESG ratings with elements of the credit rating system.

Proposing a new approach

Lastly, I drew on news, trade, and academic articles about ESG and credit ratings, as well as political, climate action, and industry trends to put together a proposal for a new accountability framework for corporate emissions. Rather than reinventing the wheel, the proposal attempts to

build on existing ESG practices, by applying credit rating best practices and taking advantage of the above-mentioned trends.

The proposal assumes 1) the new U.S. administration will attempt to implement climate-related pledges by President-elect Biden, including by mandating corporate climate risk disclosures; 2) despite currently weak market demand, fossil fuel production will remain on a trajectory that is incompatible with Paris targets unless investors and policymakers impose greater transparency and accountability on the producers; 3) the new administration will need a wide range of policy measures to meet its climate goals, including some that do not require legislative approval. The proposal is aimed at reducing corporate GHG emissions and designed to be low-cost and implementable by executive order.

RESULTS

Existing ESG ratings have limited influence over corporate behavior

Abundance of ESG rating services and methods creates conflicting results. Over 100 independent, third party services or non-profit organizations research, assess and compare publicly traded corporations based on a wide range of environmental, social, and corporate governance criteria (Holger, 2020; Huber, 2017). The first ESG ratings appeared in the 1980s in response to investor interest in socially responsible, "green" and sustainable investing (Dillenberg, 2020; Berg, 2019). A handful of firms such as MSCI, Sustainalytics, Standard & Poor's (S&P), Moody's, RepRisk, SSI, and RobeccoSAM (purchased by S&P in 2019 (Nauman, 2019b)) lead the ESG ratings market. Some raters, such as Carbon Disclosure Project (CDP), are non-profit and climate action-oriented, but most are for-profit firms that charge investors and other users for access to the ratings and related data.

ESG rating providers serve as information intermediaries that collect and analyze a large amount of complex data about corporate ESG performance and, based on their analysis, generate easily understood scores and rankings of corporations that investors can use to guide investment decisions (Caprio, 2012). Investors, environmental advocates, policymakers, and others can use the ratings to track and compare companies' risk exposure to climate change or progress towards meeting Paris Agreement targets. Rated companies can use the assessments to identify areas for improvement, to inform stakeholders, or for marketing and public relations purposes (Doyle, 2018). ESG ratings can encourage companies to be more transparent and at least announce targets for reducing emissions (Flood, 2019). As environmentally sustainable investing becomes more the norm than exception, businesses have become increasingly attentive to ESG ratings that

highlight their ESG performance (WEF, 2020). But the ratings are inconsistent, limiting their credibility with investors and impact on corporate behavior.

A 2020 study titled "Aggregate Confusion: the Divergence of ESG Ratings," by researchers at MIT Sloan and the University of Zurich highlighted ESG ratings' inconsistency. According to the study, the ratings of over 900 companies by six leading ESG rating services had an average correlation of just 0.54 (out of a possible 1.0, or 100%), which is far lower than that of corporate credit ratings by Moody's and S&P, which is 0.99 (Berg, 2019). Other studies have found even lower correlations, including 0.53 among ESG ratings of four leading data providers (State Street, 2019), and 0.32 between ratings of MSCI and Sustainalytics (Doyle, 2018). The low correlation among ESG ratings compared to credit ratings can be explained at least in part by the lack of an agreed concept of sustainability or ESG performance (both of which incorporate values-based as well as quantitative factors), while creditworthiness is well defined, but there are methodological and other reasons as well (Berg, 2019).

Inconsistency of ESG ratings limits their influence with investors. Despite concerns about consistency, most institutional investors rely to some degree on ESG research from ESG rating services and other data providers (MacMahon, 2020). Investors would likely incorporate ESG ratings more fully in decisions if the ratings were more reliable (Poh, 2019). A common complaint from investors is that rating services often produce divergent assessments and ratings for the same company. This makes "apples to apples" comparisons difficult and leaves ratings users unsure of how environmentally sustainable a firm is relative to its peer group (Mutua, 2019). For example, an oil and gas major may be rated as an environmental laggard in one rating, while a leader or

merely average in another (State Street, 2020; WEF, 2020). A firm ranked in the upper five percent of one rating may well rank in the bottom 20 percent of another (Mirchandani, 2020). Because of the variability of the ratings, interested investors (and policymakers and activists) must choose which ratings to rely upon and which to ignore.

The lack of consistency and coherence among ESG ratings diminishes their influence in guiding investors and their capital. Obscured by mixed signals, ESG ratings fail to provide a clear, "actionable" picture of how companies are managing their impact on the environment. Investors committed to managing their exposure to climate risk must navigate a crowded sea of diverse ratings for clues on various corporation's relative environmental sustainability (Doyle, 2018). A more reliable and credible ESG rating framework would have greater impact and influence on corporate behavior, by identifying for investors the ESG leaders and laggards, thus improving or weakening their reputations and access to financing (Sustainalytics, 2020; WEF 2020).

Inconsistency of ESG ratings limits their influence with rated corporations. Public corporations are both subjects and users of ESG ratings (MacMahon, 2020). Like investors, rated companies seeking actionable insights from ESG ratings. My research, however, found no clear evidence that companies are adjusting business practices or strategies based on ESG ratings. ESG ratings have so far failed to translate investor concern into significant impact on corporate behavior. The lack of consistency and credibility of current ESG ratings likely deprives them of the leverage that credit ratings can exert on rated companies. Although there is evidence companies that achieve high ESG ratings also outperform rivals on financial metrics such as share valuation and access to capital (MSCI, 2020), it is not clear there is a causal connection, i.e. that

strong ESG ratings contribute to higher share values or cheaper access to financing. Similarly, although some oil and gas companies have achieved higher ESG scores by committing to transition from fossil fuels to lower emission technologies (e.g. Ørsted, BP, Equinor) (MacMahon, 2020), there are no data suggesting ESG ratings played a key role in motivating corporate management to speed up the firms' energy transitions.

On the contrary, divergent ESG ratings leave oil and gas companies indifferent to them or at least undeterred from pursuing business as usual. Without a rigorous, competitive rating framework, oil and gas firms can manipulate or ignore their environmental scores without fear of being held accountable or having to reduce their GHG emissions (Doyle, 2018; State Street, 2019). Companies seeking an accurate appraisal of how their management of climate risk stacks up against the competition are left in the dark. There are indications, however, that more companies are paying attention to ESG ratings. The growing number of corporations willing to participate in surveys and other data collection by rating services suggests corporations recognize the value of at least cooperating with the rating process (McMahon, 2020).

Why ESG ratings lack consistency and impact on corporate behavior

There are multiple causes of ratings variability, including differences in rating methods, metrics, and weighting, data used, and rater focus/bias (Doyle, 2018). Current ratings are not standardized, coordinated, or regulated, and each rating service has its own way of assessing and ranking companies or their financial instruments (e.g. bonds). No approach or rating provider is accepted as the standard, none is a clear market leader. Some rating services follow standards for measuring and reporting companies' sustainability recommended by corporate sustainability organizations

such as the Sustainability Accounting Standards Board (SASB) and the Task Force on Climate-related Financial Disclosures (TCFD), but rating services as a whole have yet to adopt a common set of standards (Silk, 2020).

One area of variability is the different terms and benchmarks ESG rating and data providers use to compare corporations' ESG performance, or sustainability. ESG assessments for Royal Dutch Shell illustrate this variability. Shell is one of the largest emitters of CO2 among oil and gas producers over the past 50 years (Climate Accountability Institute, 2019), responsible for 80 million metric tons of direct and indirect (Scope 1 and 2) CO2 equivalent emissions in 2019 (Shell, 2020). The company received an overall "A" rating for sustainability (on a scale from CCC to AAA among oil majors, AAA being the best possible) from ESG rating service MSCI (MSCI, 2020). Another leading ESG ratings firm, Sustainalytics, rated Shell as "high risk," or 46th best among 285 oil and gas firms (Sustainalytics, 2020). The Wall Street Journal ESG research team ranked Shell the 33rd most sustainably managed company in the world, i.e. among all companies and sectors, not just other oil and gas companies (WSJ ESG research team, 2020). CDP, an environmental risk measurement and management non-profit, ranked Shell third best among 24 of the largest oil and gas companies on readiness for the transition to a low carbon economy (Fletcher, 2018).

Rating methodology and choice of criteria can determine whether a rating will highlight a company's strong or weak performance on environmental criteria, and whether the rating will motivate a company to improve. If the methodology assigns greater weight to environmental (E) indicators such as consumption of water or energy than to GHG emissions, the latter can be

overshadowed in the overall E score (Berg, 2019). In such a scenario, a company that is a leading GHG emitter could still obtain an overall high E score (Boffo, 2020). Similarly, the overall E score can be outweighed by the S or G scores if the methodology accords such factors such as charitable donations, employee relations, board oversight, and shareholder engagement higher overall significance (Escrig-olmedo, Muñoz-torres, Fernández-izquierdo, & Rivera-lirio, 2014). Some rating services accord GHG emissions lower priority in the environmental (E) dimension of ESG scores, focusing on other indicators such as toxic waste handling or financing, depending on the companies being rated (Russell Investments, 2018; Boffo, 2020). Once consequence of such a rating approach is that corporate emitters are not held fully accountable for GHG emissions and not subject to pressure to reduce emissions.

Different criteria and insufficient emphasis on GHG emissions. Most rating services base their ratings on criteria and indicators they consider "material" to the financial performance of a rated company (e.g. regulatory, reputational, market changes, or supply chain interruption), not necessarily those that measure the impact of the company on the environment (e.g. pollution, GHG emissions) (WEF, 2020; Douglas, 2017). Based on the rating service's definition of materiality, the service may therefore rate a company high for environmental performance based on how well it manages environmental risks to its operations or financial health rather even though the company is doing long-term damage to the environment through its GHG emissions. Ratings that measure the climate risks faced by a company but not its impacts on the environment provide investors only half of the story, and fail to hold the company accountable. The investor community is demanding greater transparency and guidance about both the risk exposure and environmental impact of publicly traded corporations, particularly regarding GHG emissions (Carney, 2020). Raters and investors are increasingly acknowledging that a company's impact on the environment is also a

source of financial risk for the company, e.g. from regulatory, legal, or activist action or reputational damage (WEF, 2020; RepRisk, 2020). The Wall Street Journal, for example, ranks companies higher for "balancing" environmental responsibilities with growth and profits (WSJ, 2020). However, it is not unusual for rating services to omit or downplay a company's impact on the environment, e.g. GHG emissions, on the assumption the impact is not material (Russell Investments, 2018).

Limited and selective data. Most rating services base their assessments on publicly available and corporation-provided information (Mutua, 2019), though some do not use the latter because of concerns about its reliability (RepRisk, 2020). There are no legal requirements for corporations to disclose information about their exposure to climate-related risk. While voluntary disclosures have been increasing in recent years (TCFD, 2020), they are still often incomplete and selective (Sardon, 2020). Oil and gas firms in particular are reluctant to share information that could be embarrassing. Much of what they do disclose is filtered in order to cast the firms' ESG records in the best possible light, or excludes the most potentially embarrassing data, e.g. about GHG emissions (Burita, 2018). In 2017, the TCFD recommended 11 climate-related disclosures corporations should include in their annual financial filings, including on GHG emissions, but as of June 2019, fewer than 4% of companies were fully implementing the recommendations (TCFD, 2019).

Rating bias and conflict of interest. Without a standard methodology, rating services' biases and subjective interpretations of data can skew ratings (Doyle, 2018). For example, companies with greater market capitalization score higher on ESG ratings than smaller firms in the same sector, and companies in regions with mandatory reporting requirements score better than their competitors in regions without mandatory reporting (Burita, 2018). A study comparing ratings of

different rating services found that subjectivity was a factor in ratings variability (Mayor, 2019). While ESG rating services generally do not charge rated companies a fee to be rated (unlike credit rating agencies), the lack of transparency surrounding ESG rating practices raises concerns about possible conflicts of interest (Doyle, 2018). The lack of corporate ESG disclosure requirements and auditing of ESG rating services hinders due diligence and verification.

Comparing ESG ratings with corporate credit ratings

ESG ratings share several characteristics with corporate credit ratings, including overlapping user base, participation of the "big three" firms of S&P, Moody's, and Fitch, and a role in protecting investors (Berg, 2019). But credit ratings are far more established, authoritative, and effective at influencing corporate behavior in contrast to ESG ratings (Doyle, 2018; Kisgen, 2019). Corporate credit ratings hold corporations accountable for their financial performance more noticeably than ESG ratings hold corporations accountable for their ESG performance. There are several reasons for this difference in influence, beginning with the narrower scope and purpose of credit ratings. Credit rating agencies (CRAs) assess the credit quality of corporate bonds and, by extension, the corporations that issue them. The ratings (e.g. AAA, AA, BBB) measure the rated corporation's financial condition, its relative strength within its sector, and ability to meet financial commitments.

Unlike ESG ratings, credit ratings are based on uniform, specific criteria, including a company's "financial condition, liquidity and capital resources, changes in financial condition and results of operations" (SEC, 2010). A key difference between ESG and credit ratings is that the latter are buttressed by government regulation, including: 1) government oversight and quality control over

CRAs, 2) CRAs' semi-regulatory role in the financial system, and 3) mandatory corporate disclosures of information that rating agencies need in order to make accurate, complete assessments (Nauman, 2020, March 4; SEC, n.d.b).

CRAs are regulated to ensure compliance with standards. Credit rating agencies are regulated by governments around the world, including in the United States (S&P, n.d.). The U.S. Securities and Exchange Commission (SEC) regulates CRAs to ensure they meet operational and reporting standards, including disclosure of rating methodologies and consistent application of rating procedures (SEC, 2006; SEC n.d. b). The SEC also administers a formal registration process that distinguishes CRAs that are meeting SEC standards from those that do not. This process promotes quality control and fraud prevention. To register, CRAs must meet criteria for earning the status of nationally recognized statistical reporting organizations (NRSROs) (SEC, n.d.). These criteria include the CRA's operational capability and reliability, which are assessed based on the agency's organizational structure, financial resources, size and quality of personnel; and independence from its clients, e.g. the companies it rates (SEC, 2003). The criteria have had the effect of excluding unqualified raters but also restricting the list of NRSROs to a small number including the "big three," Moody's, S&P, and Fitch (White, 2010).

The financial crisis of 2007 led to additional oversight and regulation over the credit rating system as a result of its perceived failure to foresee the crisis and warn investors about it in a timely manner (PRNewswire, 2009). In 2008 and 2009 the SEC began requiring rating firms to disclose more information about their data and methodologies (Scannell, 2008). The regulations aimed to

increase transparency in the credit ratings and restrict conflicts of interest in which rating personnel might be tempted to put profit ahead of quality (White, 2010; Scannell, 2008b).

CRAs have semi-regulatory authority. Through their long history and formal registration under SEC authority, CRAs have acquired a semi-official status in supporting the SEC's mission of protecting investors (Caprio, 2012). In the 1930s, U.S. financial regulators responsible for investor safety largely outsourced the role of assessing creditworthiness of securities and their issuers to CRAs, whose ratings thereby acquired the force of law (White, 2010). While subsequent legislation rolled back some of this authority (SEC, n.d.b), CRAs retain a pre-eminent role in judging corporate creditworthiness.

Credit ratings are supported by mandatory disclosures. Unlike ESG ratings, credit ratings benefit from legislation requiring companies to share data the CRAs need to produce meaningful, reliable ratings. Specifically, publicly traded corporations with more than $10 million in assets are required by the Securities Exchange Act of 1934 to disclose information material to their financial performance (SEC (n.d. c). Companies disclose this material information in mandatory annual reports known as 10-K filings, or in other publicly available reports. These filings providing credit rating services the data they need to assess a corporation's financial performance, risk, and creditworthiness.

The materiality requirement does not specify precisely what type of information companies must disclose or how they should disclose it. The SEC's "guidance" to companies on the requirements is general and "principle-based" rather than detailed prescriptions of what specific data companies

must disclose (SEC, 2020). The SEC's 2010 interpretive guidance on reporting requirements related to climate change encourages companies to disclose information about their climate risk, but the guidance is general and not mandatory. It recommends, for example, that "…businesses [that] may be vulnerable to severe weather or climate related events should consider disclosing material risks of, or consequences from, such events in their publicly filed disclosure documents" (SEC, 2010). This guidance affords corporations considerable flexibility in deciding what data are material and whether to disclose them in annual filings (Stevenson, 2019). Many corporations consider GHG emissions not to be material to their operations or financial condition and therefore do not disclose emission levels or plans for managing them (CERES, 2010). Although each year more companies include GHG data as part of their annual reports, current GHG disclosures in general are not sufficient to allow detailed analysis or meaningful comparisons between carbon-intensive companies.

CRAs are independent and profitable (despite being regulated). Despite the additional regulation, CRAs are still largely independent and profitable, with a market size in the United States alone of $11.7 billion (IBIS, 2020). SEC exercises oversight but does not have the authority to decide credit ratings or the specific methodologies or criteria used by rating services to formulate their ratings (Kane, 2020).

Credit ratings are highly influential. The net result of semi-regulatory authority, government oversight, and mandatory corporate disclosures of information essential to raters and regulations ensuring standardization as well as oversight is that the credit ratings are authoritative and impactful. The ratings are widely respected as sources of accurate, consistent, comparable, and

relevant information. They are publicly available and highly influential since investors trust them and rely on them heavily when making decisions about whether to invest in a corporation. In order to remain competitive, rated corporations must take the ratings seriously, since a good or bad rating could affect their ability to sell bonds, obtain financing and continue growing. For example, a company's stock or bond price will likely decline and its credit spread will increase if its credit rating is downgraded (Caprio, 2012; SEC, 2003; Hand, 1992). Credit ratings are therefore powerful instruments for holding corporations accountable for meeting their financial commitments and managing financial risks.

ESG ratings modeled after credit ratings would be more influential. Applying key elements of the credit rating system such as regulation, mandatory corporate disclosures, NRSRO standardization to ESG ratings would likely make the latter more consistent and influential. There is evidence that companies respond to being rated on ESG criteria when the rating provider and rating framework are credible and authoritative. For example, after several corporate credit rating agencies began including ESG metrics in their credit ratings, some rated companies began taking steps to improve their ESG performance in order to gain a competitive edge in the ratings (Dow Jones, 2019). If ESG rating services could acquire a level of credibility and consistency approaching that of CRAs, corporations would likely adapt their strategies to improve ESG ratings also.

Proposing a new approach: an ESG rating framework based on credit ratings

ESG ratings enjoy a growing readership and clientele in the financial services and climate action arenas. The ratings could be more useful and impactful in reducing GHG emission if they 1)

incorporated features of the credit rating system and 2) focused more rigorously on greenhouse gas emissions. The resulting ratings would collectively make up a framework of accountability that would help and protect investors and motivate fossil fuel companies (especially oil and gas majors) to lower carbon emissions. The framework would establish clear and uniform "rules of the game" for rating services and rated companies. Just as the corporate credit ratings provide a framework for protecting investors from undisclosed financial risk, ESG ratings could play a similarly valuable role in protecting investors from undisclosed climate risk. As with the credit rating system, the new ESG rating framework would be independent and market-based but involve government regulation and oversight. The new framework would also leverage investor interest in managing risk to motivate corporate environmental performance. The goal of the framework would be to help ensure that every important corporate decision takes climate change into account (Carney, 2020).

Key elements of such a framework would include:

Government regulation to ensure quality and integrity. The U.S. government would establish an oversight and registration system for ESG rating services regulated by the SEC, similar to that established for credit rating agencies. Policymakers would model regulations on provisions of the U.S. Credit Agency Reform Act (CRA) of 2006, which requires credit agencies that wish to obtain the status of a "nationally recognized statistical rating organization" (NRSRO) to meet minimum standards of transparency, credibility and reliability (Credit Rating Agency Reform Act, 2006). The new ESG framework would include elements of the 2006 Act that aimed to promote competition among registered credit rating services and provided investors with greater choice,

better quality ratings, at lower cost (Kane, 2020). Policymakers would also draw on the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, which increased government oversight of credit rating agencies and established greater scrutiny of large corporations.

ESG rating services that wished to become NRSROs (or a similar designation under a different name) would be required to apply to the SEC and to provide in their applications and subsequent annual reports information about their rating methodologies, criteria, clients, and any potential conflicts of interest. Eligibility requirements would include (1) national recognition (i.e., the applicant is recognized as an issuer of credible and reliable ratings by the predominant users of ESG ratings in the United States); (2) adequate staffing, expertise, management and financial resources to issue credible and reliable ratings of the sustainability of issuers and withstand economic pressure from clients (rated companies); (3) use of systematic rating procedures/methodologies intended to produce credible and accurate ratings; (4) internal controls to protect nonpublic information from misuse (SEC, 2003). The registration process and resulting oversight would improve standardization and consistency.

The SEC would establish an office similar to the one created in 2012 to monitor credit rating agencies, the Office of Credit Ratings (OCR), to (1) protect ESG rating users and the general public; (2) improve accuracy of ESG ratings; (3) reduce the potential for conflicts of interest; (4) establish standards for registrants, review and decide on applications for NRSRO status (Kane 2020). The office for overseeing ESG ratings (perhaps the Office of ESG Ratings, OER) should conduct annual inspections of each ESG rating service registered as a NRSRO and issue a public

report on key findings regarding compliance with standards (Kane, 2020). The SEC would revoke NRSRO status of ESG rating services that fail to meet established standards.

Standardization to improve consistency. OER regulators would develop a broad set of rating principles and standards for ensuring quality and consistency of rating criteria and methodologies, based on recommendations of the Global Framework for Climate Risk Disclosure (Global Framework for Climate Risk Disclosure, 2006), TCFD and SASB, as well as on SEC standards for credit rating agencies. The criteria and methodologies would explicitly include metrics for current and projected GHG emissions (see below). Standards would include transparency, accuracy, consistency, and completeness in ESG ratings and reporting. Regulators would take into account comments from the public, affected companies, international organizations and government agencies before finalizing standards, consistent with standard rulemaking procedures. The OER would invite ESG rating services to apply for NRSRO status and would use the approved rating standards and principles to determine eligibility.

Registered ESG rating services would need to adapt their rating practices to meet SEC standards in order to attain NRSRO status and the accompanying credibility and validation. Rating services would have to be transparent and consistent in applying standard benchmarks for assessing and rating corporate sustainability (unlike under current free-for-all ESG rating practices). However, the proposed Office of ESG Ratings (OER) would set standards for NRSROs that are general enough to allow rating services to maintain their individual areas of focus, interpretations of data, and analyses. In this way, registered rating services would to a large extent be able to maintain their independence and market-based (or non-governmental) character. The resulting ratings

framework would be standardized and regulated but also competitive and self-sustaining, as with the credit rating system.

Emissions-focused ratings: adding an E_{GHG}, score. Most significant among SEC standards for the new ESG framework would be a requirement that registered ESG rating agencies provide a stand-alone emissions, or "$E_{GHG,}$" score for each company they rate. The E_{GHG} score would indicate how well each rated company is managing its greenhouse gas emissions, both in terms of risks to itself and risks to the environment. The E_{GHG} score would be based on GHG emissions-related metrics, including current and projected GHG emissions, emissions intensity, and plans for reducing GHG emissions through the full life-cycle of produced GHGs, including scope 1-3 emissions (TCFD, 2020; Fletcher, 2018). The SEC would encourage rating services to use a standard protocol for GHG accounting and reporting, endorsed by a reputable sustainability organization such as SASB or the Greenhouse Gas Protocol (Greenhouse Gas Protocol, n.d.).

"That which gets measured gets managed." The purpose of the new E_{GHG} score would be to highlight for investors the single-most important indicator of a company's contribution to (or mitigation of) global warming, i.e. GHG emissions, and ensure this metric is not diluted or over-shadowed by other climate-risk metrics. A specific, unadulterated, emissions-centric score would also add pressure on fossil fuel companies to manage and lower their emissions. Easily understood, standardized, and widely available rankings of companies based on their emissions management would create competition among major emitters to devise more effective strategies for lowering emissions and achieving better E_{GHG} scores. E_{GHG} scores would supplement, not replace E and ESG scores. Rating agencies would continue issuing conventional E and ESG scores

since these scores reflect a wide range of environmental, social, and governance performance indicators relevant to investment decisions. The SEC would require rating services to incorporate SASB and/or TCFD recommendations so that $E_{GHG,}$ E, and ESG scores adequately represent how well a company is managing its emissions.

Paris-aligned and science-based standards. A key ESG rating benchmark would be the alignment of a company's current and projected greenhouse gas emissions with targets established by the Paris Climate Agreement (Almono, 2019). Rating agencies would assess whether corporations that are not on a Paris-compatible pathway have realistic and science-based plans to get there. Raters would include in their ratings an assessment of how well a corporation's plans for reducing emissions are grounded in science, based on recommendations from credible sources such as Science Based Targets (Science Based Targets, n.d.).

Reduction-oriented. To support the goal of motivating companies to reduce their greenhouse emissions, the new ESG rating framework would assign more value to companies' direct emissions reductions than to indirect cuts. For example, companies would receive a higher E_{GHG} or E score for reducing methane leaks or increasing the percentage of renewables in their energy consumption than, for example, buying unbundled renewable energy credits (RECs) or other offset credits (Almono, 2019). Investments in clean energy would also count. Companies would get credit for avoided GHG emissions achieved through investments, e.g. in wind power or other renewable energy projects (Fletcher, 2018).

Mandatory disclosures of climate-risk data. In keeping with President-elect Biden's November 2 pledge (Whieldon, 2020), the SEC would require corporations to disclose climate-risk related data recommended by SASB and TCFD, in particular total GHG emissions, future reductions targets, avoided emissions, and plans for reaching Paris-aligned levels (BlackRock, 2020; Dietz, 2018). The SEC would update its 2010 guidance on climate risk disclosures to explicitly state that it considers corporate GHG emissions and other impacts on the environment to be material for carbon-intensive corporations such as fossil fuel producers. The updated guidance would be more specific and prescriptive about what types of climate-risk data corporations must include in their annual filings, again, drawing from SASB and TCFD recommendations. Ratings services would therefore have access to more complete and uniform data. Ratings would better reflect how well a firm is managing its climate risk exposure as well as its impact on the environment.

DISCUSSION

The worsening effects of greenhouse gases and global warming on the environment and economy (e.g. UNEP, 2020; WMO, 2020) have increased investor demand for reliable ESG data and ratings (Jebe, 2019). The investment community wants more transparent, consistent, accurate information about corporate GHG emissions and other environmental risks in order to make better-informed investment decisions (Carney, 2020). Sustainability organizations and climate activists also seek ESG data to hold corporations accountable and pressure them to adopt more sustainable business practices. ESG ratings in their current form are not sufficient to compete with well-established market incentives driving fossil fuel companies to continue exploring, extracting, and producing oil and gas. However, if bolstered by greater credibility, transparency, and focus on emissions, ESG ratings could provide the basis for an effective new accountability framework. The more robust ESG framework proposed by this paper would provide two elements missing from current ratings: 1) accurate, comprehensive, comparable information about GHG emissions and other climate risks faced and/or created by corporations, and 2) a transparent, effective accountability structure for assessing and comparing how companies mitigate and manage those risks. The two elements would allow investors and policymakers to leverage competitive pressure and hard data about climate-related risk to drive down corporate GHG emissions.

Implementation and limitations of the proposed framework

A new emissions-centric ratings framework would of course not be a silver bullet, but rather serve as one of many market-based instruments in the climate policy toolbox to help put the United

States on a trajectory to reach carbon-neutrality by 2050. The new framework would have to overcome several limitations and challenges. First, to function as intended (as an accountability framework as well as a service to investors and corporate clients), the new ratings would require the active cooperation of all key players: the SEC would need to adopt the proposed regulations on standardized, emissions-focused ratings and mandatory disclosures. Rating services would have to apply for NRSRO status and meet SEC standards and regulations. Oil and gas and other fossil fuel producers would have to accept the new framework, make the required disclosures, and align their business strategies with Paris targets.

Will the SEC support greater ESG accountability under the Biden administration?

The SEC has traditionally taken a conservative stance regarding proposed changes to corporate disclosure requirements (including on climate risk) or guidance to credit rating agencies on their methods and criteria. Investors representing over $29 trillion in assets have urged the SEC to adopt rules requiring companies to disclose climate risks (Ceres, 2020). But the SEC remains reluctant to overburden companies with additional specific reporting requirements or to depart from its long-standing principles-based (vs. prescriptive) guidance on annual filings (SEC, 2020). The SEC commissioners have expressed skepticism about the value and reliability of current ESG ratings (Clayton, 2020; Roisman, 2020) and opposed mandatory disclosure of ESG data (Jebe, 2019).

SEC leadership and its stance on climate risk disclosures will likely change under the new administration. President-elect Biden pledged on 2 November that he would sign an executive order requiring corporations to disclose climate-related risks, including GHG emissions (Whieldon, 2020). Such an order would presumably require the SEC to issue new guidance to

credit rating agencies and rated corporations (Dow Jones, 2020). It is unclear, however, how the Biden administration SEC would react to a proposal for creating a new ESG framework modeled after the credit rating system. It is possible that the SEC would issue instructions requiring more robust ESG disclosures but not support a new ESG rating framework. A subcommittee of the SEC Investor Advisory Committee began exploring options in May 2020 for ensuring investors have access to relevant climate-related information without having to rely on third party ESG data providers (SEC, 2020). Current SEC commissioners remain divided on ESG matters and declined to include disclosure guidelines on environmental risk in an August 2020 update of corporate reporting requirements, despite thousands of public requests for such guidelines (Lee, 2020).

Why not combine credit ratings and ESG ratings? If the SEC does decide to require corporations to disclose climate risks, it might rely on credit rating agencies to reflect these risks more systematically in their credit ratings, rather than creating a new ESG rating framework. Some credit rating agencies, on their own initiative, have already begun including ESG factors with traditional financial risk factors in their ratings. However, there are drawbacks to relying on credit rating agencies to produce ratings that incorporate ESG factors as well as financial factors. For starters, CRAs already must consider a broad range of factors when assessing and rating a corporation's financial condition and creditworthiness. Increasing the number of issues to be measured and reflected in a credit score could lead to individual ESG factors such as emissions being diluted or obscured by the financial indicators on which credit ratings are traditionally based, e.g. profitability or cash flow.

The traditional focus of credit rating agencies on financially material indicators hinders makes them ill-suited to assess corporations based on climate-risk indicators, especially those recommended by TCFD, e.g. GHG emissions, which are not accepted by all CRAs and corporations as financially material. As the financial consequences of global warming become increasingly obvious and measurable, CRAs will likely assign climate risk factors greater importance in their ratings of corporate creditworthiness. Credit ratings will continue to reflect, however, a broad range of other corporate financial factors (in addition to climate-related ones). Credit ratings therefore should be supplemented (not combined) with standalone ESG and E_{GHG} ratings to provide investors and other consumers with a fuller, more granular picture of corporate environmental performance.

A separate emissions-centric ESG rating framework would best serve investors. The most effective way to highlight how well a company is managing climate-related risk relative to other companies would be through a standalone, standardized, emissions-focused ESG accountability framework, i.e. separate from credit ratings. In addition to highlighting corporate climate impact and risk in a way that combined credit/ESG ratings would not, the standalone approach would build on a growing ESG market (currently valued at an estimated $200 million, with the potential to grow to $500 million by 2024 (Nauman, 2019)). Despite their lack of consistency and reliability, ESG ratings enjoy growing usership in the investment community. Building on the parts of the existing ESG rating platform that work well (e.g. business model, organizational structure, expertise) would take advantage of accumulated experience, avoid reinventing the wheel, and ensure investors receive information needed to manage climate risk.

To help investors manage climate risk, the E_{GHG} score would be most effective as an obligatory and separate feature of ESG ratings, complementing the individual E, S, G scores and aggregate ESG scores. Many ESG rating services already have the necessary expertise, experience, organization and personnel for analyzing and including GHG emission metrics in their ratings. Assuming the role of issuing a standardized E_{GHG} score would be a more efficient and natural transition for ESG rating providers than for CRAs. Some credit rating agencies such as Moody's and S&P have shown their confidence in the future of the stand-alone ESG market by issuing their own ESG ratings, separate from their credit ratings (Nauman, 2019; 2019b).

ESG rating services (and their fossil fuel-intensive clients) might resist a new ESG framework as unwanted meddling with their current (lucrative) ESG rating practices and business model. Others would welcome the additional climate risk disclosures, clearer rules, and (for smaller rating firms) a level playing field. The majority of ESG raters/data providers that are not also big three credit rating firms would also likely view a new framework that builds on existing ratings, rather than replacing them, as a better alternative to seeing ESG ratings absorbed by the credit rating agencies. Some ESG raters may also prefer the proposed framework to possible heavier-handed regulation imposed on them by Congress, as experienced by CRAs in 2010 under Dodd-Frank legislation.

The more established, better resourced ESG ratings/data providers might be more inclined to support the new framework since they are more likely to meet SEC criteria for becoming NRSROs, while smaller providers may not. The NRSRO registration process for ESG raters would thus likely lead to the same consolidating effect that it had with registered CRAs, which currently

number about 10. While consolidation might have an anti-competitive effect, the reduced number of rating providers would help achieve greater standardization, consistency and reliability among them as a group.

Fossil fuel companies would likely resist any initiative intended to hold them more accountable for emissions and other impacts on the environment. However, the stranglehold of fossil fuel interests over public policy discourses (Evans and Phelan, 2016) may be weakening, and the proposed market-based framework would likely provoke less opposition from industry than more interventionist measures such as a national cap and trade scheme or strict curbs on exploration or production. Far from trying to shut down carbon-intensive companies, the proposed new ESG rating framework is designed to motivate them to accelerate changes in business strategy or practices they will eventually need to make to remain competitive. In reaction to stricter EU climate policy measures, a few European oil and gas majors such as BP, Shell, and Equinor seem to be charting lower-carbon courses, though so far mostly on paper (BP, 2020; Shell, 2020; Equinor, 2020). Facing growing pressure from investors, activists, and governments for greater emissions reductions and disclosures, some oil and gas companies may grudgingly accept a market-based accountability framework based on known models and administered by familiar players.

How long will it take to implement? Another challenge faced by the proposed framework is the time required to establish it. It took decades for corporate credit ratings to reach their current level of reliability and authority and to become the standard for assessing and ranking companies according to financial criteria. The foundation of the proposed framework, however, already

exists, and its approval and implementation could be accelerated by applying best practices and lessons learned from the credit rating system. While any significant climate initiative will need to clear policymaking and regulatory hurdles, the proposed framework should require only executive, not legislative approval and should be achievable within one administration.

Future research

A review of ESG disclosures, ratings, and related regulatory initiatives underway in the European Union, China, and other countries might uncover insights applicable in the U.S. context but was beyond the scope of this research project. Further research into how successfully former fossil fuel companies such as Ørsted have converted themselves into renewable energy firms (Ørsted, n.d.), or how the announced transitions of oil and gas majors such as BP and Equinor are progressing, would also help guide the development of policies aimed at motivating such companies to adopt lower-emission business strategies. Also, new initiatives, players, and market dynamics are constantly emerging across the rapidly evolving ESG landscape. My research was able to cover only a fraction of the developments that merit further study and incorporation in policy efforts to accelerate decarbonization of the economy.

CONCLUSION

President-elect Biden has described climate change as the greatest threat facing the United States and pledged to ensure the country reaches net-zero emissions by 2050 (Biden campaign, 2020). Achieving this goal will likely require numerous policy measures of varying ambition and scope.

The new ESG rating framework proposed in this paper builds on recent regulatory and market trends, including rising investor pressure on corporations to reduce their environmental impact and exposure to climate risk. The proposed framework would complement, not substitute for, other existing and proposed measures. Though the success of even this modest proposal is far from assured, its relatively non-controversial, low-cost, and non-legislative approach would facilitate its adoption and implementation. The proposed framework would also assert U.S. leadership on global financial and environmental regulation at a time when Europe and China are emerging as the de facto standard-setters and the world is demanding public and private action to prevent global warming from reaching crisis levels.

The United States has a history of imposing regulations on the financial markets in the aftermath of devastating financial crises. The 2001 Enron bankruptcy and aftermath, which inflicted billions in losses on investors, led to the Sarbanes-Oxley Act requiring companies to disclose more comprehensive and timely information about their financial condition and results; the 2008 sub-prime mortgage crisis and stock market crash prompted the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act, which tightened government oversight over credit ratings agencies. In retrospect, the need for such intervention was obvious well before the crises occurred. The enormous climate risk exposure of major corporations and their financial backers calls for urgent preventive policy action. The Biden administration should work with Congress to ensure history does not repeat itself, and implement measures establishing greater corporate disclosure and regulatory oversight in the ESG space. A credible, reliable ESG accountability framework would be a small but positive step towards mitigating global warming and averting the first financial crisis caused by climate change.

REFERENCES

Almono, M., Hunter, L., Parsons, B., and Wetstone, G. (2019). American Council of Renewable Energy. ESG 2.0: How to improve ESG scoring to better reflect renewable energy use and investment. https://acore.org/publications/

Berg, Florian and Kölbel, Julian and Rigobon, Roberto. (2020). Aggregate Confusion: The Divergence of ESG Ratings. Available at SSRN: https://ssrn.com/abstract=3438533 or http://dx.doi.org/10.2139/ssrn.3438533

BlackRock. (2020). Sustainable investing: Resilience and uncertainty. https://www.blackrock.com/us/individual/about-us/sustainability-resilience-research?cid=ppc:BSIpaperv3:google:all

Boffo, R., C. Marshall and R. Patalano (2020), "ESG Investing: Environmental Pillar Scoring and Reporting", OECD Paris, www.oecd.org/finance/esg-investing-environmental-pillar-scoring-and-reporting.pdf. British Petroleum (2020).

BP. (2020). Sustainability Report 2019. https://www.bp.com/en/global/corporate/sustainability.html

Burita, M. (2018, Jul 19). Uncharted territory: New report finds influential ESG rating agencies are subjective, inconsistent, and lack standardization: ACCF questions the current ratings process used for ESG investment. *PR Newswire* Retrieved from https://search.proquest.com/docview/2071524024?accountid=11752

Caprio, G. (2012). Handbook of Key Global Financial Markets, Institutions, and Infrastructure. 1st edition Academic Press.

Carney, M. (2020). Speech on "The Road to Glasgow." Bank of England. www.bankofengland.co.uk/news/speeches

CDP. (2019). CDP 2019 climate change scoring methodology.

Clayton, J. (2020). SEC Chair Clayton's statement at the investor advisory committee meeting (May 21, 2020). *https://www.sec.gov/news/public-statement/clayton-statement-investor-advisory-committee-meeting-052120*)

Coffin, M. (2020). Absolute impact: why oil majors climate ambitions fall short of Paris limits. Carbon Tracker. https://carbontracker.org/reports/absolute-impact/

Credit Rating Agency Reform Act of 2006, PUBLIC LAW 109–291—SEPT. 29, 2006 120 STAT. 1327

Crowley, K., & Rathi, A. (2020, Oct 06). Exxon's plan for surging carbon emissions revealed in leaked documents. Bloomberg Wire Service Retrieved from http://proxy.library.jhu.edu/login?url=https://www.proquest.com/wire-feeds/exxon-s-xa0-plan-surging-carbon-emissions/docview/2448474104/se-2?accountid=11752

Cummis, C. (2018). The World Is Counting on Banks to Deliver Climate Finance. Counting Their Progress Is No Easy Feat. *Greenhouse Gas Protocol*. https://ghgprotocol.org/blog/world-counting-banks-deliver-climate-finance-counting-their-progress-no-easy-feat

Dietz, S. (2018). Carbon performance assessment in oil and gas. *TPI*. https://www.transitionpathwayinitiative.org/

Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, Pub. L. 111-203, 124 Stat. 1376

Douglas, E., Van Holt, T., Whelan, T. (2017). Responsible Investing Guide to ESG Data Providers and Relevant Trends. *Journal of Environmental Investing.* https://cbey.yale.edu/

Doyle, T. (2018). American Council For Capital Formation. "Ratings That Don't Rate: The Subjective World of ESG Rating Agencies." http://accfcorpgov.org/wp-content/uploads/2018/07/ACCF_RatingsESGReport.pdf

Equinor. (2020). 2019 Sustainability Report. https://www.equinor.com/en/how-and-why/sustainability.html

Escrig-olmedo, E., Muñoz-torres, M. J., Fernández-izquierdo, M. Á, & Rivera-lirio, J. M. (2014). Lights and shadows on sustainability rating scoring. Review of Managerial Science, 8(4), 559-574. doi:http://dx.doi.org/10.1007/s11846-013-0118-0

Evans, G., Phelan, L. (2016). Energy Policy. Vol. 99. 329–339. Transition to a post-carbon society: Linking environmental justice and just transition discourses.

Exxon (2019). 2018 Sustainability Report. https://corporate.exxonmobil.com/Community-engagement/Sustainability-Report.

Fletcher, L., Crocker, T., Smyth, J., Marcell, K. (2018). Beyond the cycle: which oil and gas companies are ready for the low-carbon transition? CDP. https://www.cdp.net/en/investor/sector-research

Galey, P. (2020). Climate goals need 6% yearly fossil fuel cuts, UN says. AFP International Text Wire in English Retrieved from http://proxy.library.jhu.edu/login?url=https://www.proquest.com/docview/2466005793?accountid=11752

Global Carbon Project (2019) Carbon budget and trends 2019. [www.globalcarbonproject.org/carbonbudget] published on 4 December 2019

Global Framework for Climate Risk Disclosure. (2006). https://www.unepfi.org/publications/climate-change-publications/global-framework-for-climate-risk-disclosure/

Greenhouse Gas Protocol. (n.d.). Corporate Accounting and Reporting Standard. https://ghgprotocol.org/corporate-standard

HAND, J.R.M., HOLTHAUSEN, R.W. and LEFTWICH, R.W. (1992), The Effect of Bond Rating Agency Announcements on Bond and Stock Prices. The Journal of Finance, 47: 733-752. https://doi.org/10.1111/j.1540-6261.1992.tb04407.x

Huber, B. (2017). ESG reports and ratings: what they are, why they matter. Harvard Law School Forum on Corporate Governance. https://corpgov.law.harvard.edu/2017/07/27/esg-reports-and-ratings-what-they-are-why-they-matter/

IBIS. (2020). Credit Bureaus & Rating Agencies in the US - Market Size 2005–2026.IBISWorld. https://www.ibisworld.com/industry-statistics/market-size/credit-bureaus-rating-agencies-united-states/#:~:text=What%20is%20the%20market%20size,is%20%2411.7bn%20in%202020.

IEA (2019), World Energy Outlook 2019, IEA, Paris https://www.iea.org/reports/world-energy-outlook-2019

IEA (2019), World Energy Model, IEA, Paris https://www.iea.org/reports/world-energy-model

IPCC. (2018). Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments. https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/

Jebe, R. (2019). The convergence of financial and ESG materiality: Taking sustainability mainstream. American Business Law Journal, 56(3), 645. doi:10.1111/ablj.12148

Kane, J. (2020). The SEC's Office of Credit Ratings and NRSRO Regulation: Past. Present. and Future. SEC Office of Credit Ratings. https://www.sec.gov/page/ocr-section-landing

Kisgen, D. J. (2019). The impact of credit ratings on corporate behavior: Evidence from moody's adjustments. Journal of Corporate Finance, 58, 567-582. doi:https://doi.org/10.1016/j.jcorpfin.2019.07.002

Langley, K. (2020, Aug 25). Exxon's departure from dow highlights market's retreat from energy bets; after being the largest U.S. company as recently as 2013, exxon has been eclipsed by technology giants. Wall Street Journal (Online) Retrieved from http://proxy.library.jhu.edu/login?url=https://www.proquest.com/docview/2436933290?accountid=11752

MacMahon, Simon. 2020. The challenge of rating esg performance. *Harvard Business Review* 98 (5) (Sep): 52-4, http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,shib&db=bsu&AN=144910742&site=ehost-live&scope=site&authtype=ip,shib&custid=s3555202.

Mirchandani, B. (2020). What to make of the SEC's warnings on ESG ratings and recommendations for ESG disclosures. *Forbes.* https://www.forbes.com/sites/bhaktimirchandani/2020/05/29/what-to-make-of-the-secs-warnings-on-esg-ratings-and-recommendations-for-esg-disclosures/?sh=6f21f4b13184

MSCI. (2020). ESG ratings corporate search tool. https://www.msci.com/our-solutions/esg-investing/esg-ratings/esg-ratings-corporate-search-tool/issuer/royal-dutch-shell-plc/IID000000002137074

MSCI. (2019, September). MSCI ESG ratings methodology. *MSCI ESG Research*. https://www.msci.com/our-solutions/esg-investing/esg-ratings

Mayor, T. (2019). MIT Sloan School of Management. Why ESG ratings vary so widely and what you can do about it. https://mitsloan.mit.edu/ideas-made-to-matter/why-esg-ratings-vary-so-widely-and-what-you-can-do-about-it

Mutua, C., & Poh, J. (2019, Nov 22). These agencies want to check who's naughty and who's nice. *Bloomberg Wire Service* Retrieved from http://proxy.library.jhu.edu/docview/2316802428?accountid=11752

Nauman, B. (2020). Heavy flows into ESG funds raise questions over ratings. FT.Com, Retrieved from http://proxy.library.jhu.edu/login?url=https://www.proquest.com/trade-journals/heavy-flows-into-esg-funds-raise-questions-over/docview/2371526167/se-2?accountid=11752

Nauman, B. (2020, Sep 14). ESG surges as investors hunt for better corporate citizens: ESG pandemic puts spotlight on need to tackle ills such as climate change. Financial Times Retrieved from http://proxy.library.jhu.edu/login?url=https://www-proquest-com.proxy1.library.jhu.edu/docview/2450887387?accountid=11752

Nauman, B. (2019). Credit rating agencies join battle for ESG supremacy. *FT.Com,* Retrieved from https://search.proquest.com/docview/2291829474?accountid=11752Shell. (2020). 2019 Sustainability Report. https://reports.shell.com/sustainability-report/2019/.

Nauman, B. (2019b). S&P acquires ESG ratings arm of RobecoSAM. FT.Com, Retrieved from http://proxy.library.jhu.edu/login?url=https://www-proquest-com.proxy1.library.jhu.edu/docview/2316666890?accountid=11752
Oil and Gas Climate Initiative (OGCI). (2020). OGCI Carbon Intensity Target. Oil and Gas Climate Initiative. https://oilandgasclimateinitiative.com/carbon-intensity-target-pr/

Orsted. (n.d.). A remarkable transformation to renewables. https://orsted.com/en/explore/business-transformation

Phelan, L., Henderson-Sellers, A., Taplin, R. (2013). The Political Economy of Addressing the Climate Crisis in the Earth System: Undermining Perverse Resilience, New Political Economy, 18:2, 198-226, DOI: 10.1080/13563467.2012.678820

Poh, J. (2019) Conflicting ESG ratings are confusing sustainable investors. Bloomberg. https://www.bloomberg.com/news/articles/2019-12-11/conflicting-esg-ratings-are-confusing-sustainable-investors

Principles for Responsible Investment (PRI). (2020) The principles for responsible investment brochure. https://www.unpri.org/pri/about-the-pri

PRNewswire. (2009). Rating agencies under attack. Reactions. Retrieved from http://proxy.library.jhu.edu/login?url=https://www-proquest-com.proxy1.library.jhu.edu/docview/209736676?accountid=11752

RepRisk. (n.d.) Approach. *RepRisk website.* https://www.reprisk.com/approach

Royal Dutch Shell. (2020). Greenhouse Gas Emissions (GHGs) https://www.shell.com/sustainability/sustainability-reporting-and-performance-data/performance-data/greenhouse-gas-emissions.html

Roisman, E. (2020). Keynote Speech at the Society for Corporate Governance National Conference. https://www.sec.gov/news/speech/roisman-keynote-society-corporate-governance-national-conference-2020

Russell Investments. (2018). "Materiality Matters: Targeting the ESG issues that can impact performance – the material ESG Score," https://russellinvestments.com/-/media/files/us/insights/institutions/governance/materiality-matters.pdf?la=en

Sardon, M. (2020). The ESG Investor's Challenges: It isn't easy to find companies that are as progressive or as transparent as many investors would like. *Wall Street Journal.* https://www.wsj.com/ articles/ the-esg-investors-challenges-11602622444

Sarlieve, M. (2020). Climate change: How to make corporations responsible? *Justiceinfo.net.* https://www.justiceinfo.net/en/justiceinfo-comment-and-debate/opinion/43130-climate-change-how-to-make-corporations-responsible.html

Scannell, Kara, and Lucchetti, Aarpm. 2008. Credit crunch: SEC backs changes in rules on ratings; plan would bring greater disclosure; key firms back it. Wall Street Journal2008. http://proxy.library.jhu.edu/login?url=https://www-proquest-com.proxy1.library.jhu.edu/docview/399071980?accountid=11752.

Scannell, Kara, and Aaron Lucchetti. 2008b. SEC says debt-rating firms sacrificed quality for profit. Wall Street Journal2008. http://proxy.library.jhu.edu/login?url=https://www-proquest-com.proxy1.library.jhu.edu/docview/399080171?accountid=11752.

Science Based Targets. (n.d.). Step-by-step guide. https://sciencebasedtargets.org/what-is-a-science-based-target/

Silk, D., Niles, S. (2020). BlackRock Nudges Companies Toward a Common Standard (SASB + TCFD). https://corpgov.law.harvard.edu/2020/01/18/blackrock-nudges-companies-toward-a-common-standard-sasb-tcfd/

Standard&Poor's. (2014). Corporate rating methodology. *Standard&Poor's Rating Services* https://www.spratings.com

S&P. (n.d.). Understanding credit ratings. S&P Global. https://www.spglobal.com/ratings/en/about/understanding-ratings?gclid=Cj0KCQjwg8n5BRCdARIsALxKb97ui6OHEjKOTadi8cEXwAv8nK2Y4H9rz3NUhAw64z9ECpneldtzgiIaAjx2EALw_wcB

State Street. (2019). The ESG data challenge. State Street Global Advisors. https://www.ssga.com/investment-topics/environmental-social-governance/2019/03/esg-data-challenge.pdf

Sustainability Accounting Standards Board (SASB). (2020). SASB Implementation Supplement: Greenhouse Gas Emissions and SASB Standards. https://www.sasb.org/knowledge-hub/sasb-implementation-supplement-greenhouse-gas-emissions-and-sasb-standards/

Sustainability Accounting Standards Board (SASB). (2016). Sustainability Accounting Standards Board Climate Risk Technical Bulletin. https://www.sasb.org/standards-overview/

Sustainalytics. (2020). Company ESG risk ratings: Royal Dutch Shell PLC. https://www.sustainalytics.com/esg-rating/royal-dutch-shell-plc/1030264212/

Task Force on Climate-related Financial Disclosure (TCFD). (2020). 2020 Status Report. *Financial Stability Board.* https://www.fsb.org/2020/10/2020-status-report-task-force-on-climate-related-financial-disclosures/

Task Force on Climate-related Financial Disclosure (TCFD). (2019). 2019 Status Report. *Financial Stability Board.* https://www.fsb.org/2020/10/2020-status-report-task-force-on-climate-related-financial-disclosures/

Timmons, J. (2015, Jul 08). America doesn't need a carbon tax; A carbon tax isn't the right policy--and it's time our elected leaders say it. Wall Street Journal (Online) Retrieved from http://proxy.library.jhu.edu/login?url=https://www.proquest.com/newspapers/america-doesnt-need-carbon-tax-isnt-right-policy/docview/1694868165/se-2?accountid=11752

UN Global Compact. (n.d.). Ten principles of the UN Global Compact. https://www.unglobalcompact.org/what-is-gc/mission/principles

UNEP. (2020). Record temperature trajectory threatens to breach 1.5°C global heating threshold. https://www.unenvironment.org/news-and-stories/story/record-temperature-trajectory-threatens-breach-15degc-global-heating
U.S. Energy Information Agency (EIA). (2019). Annual Energy Outlook 2019. www.eia.gov

U.S. Securities and Exchange Commission (SEC). (2020). Draft Recommendation from the Investor-as-Owner Subcommittee of the SEC Investor Advisory Committee Relating to ESG Disclosure (as of May 14, 2020) https://www.sec.gov/news/public-statement/peirce-statement-investor-advisory-committee-meeting-052120

U.S. Securities and Exchange Commission (SEC). (2010). 17 CFR PARTS 211, 231 and 241 [Release Nos. 33-9106; 34-61469; FR-82] Commission Guidance Regarding Disclosure Related to Climate Change. https://www.sec.gov

U.S. Securities and Exchange Commission (SEC). (n.d.). Current NSROs. https://www.sec.gov/ocr/ocr-current-nrsros.html
U.S. Securities and Exchange Commission (SEC). (n.d. b). Credit rating agencies. https://www.sec.gov/spotlight/dodd-frank/creditratingagencies.shtml

U.S. Securities and Exchange Commission (SEC). (n.d. c). Securities Exchange Act of 1934. https://www.sec.gov/answers/about-lawsshtml.html#secexact1934

U.S. Securities and Exchange Commission (SEC). (2006). Credit agency reform act. www.sec.gov › ocr › cra-reform-act-2006

U.S. Securities and Exchange Commission. (2003). Report on the Role and Function of Credit Rating Agencies in the Operation of the Securities Markets. https://www.sec.gov

van Marrewijk, M., & Werre, M. (2003). Multiple Levels of Corporate Sustainability. *Journal of Business Ethics*, *44*(2/3), 107–119. https://doi-org.proxy1.library.jhu.edu/10.1023/A:1023383229086

Wall Street Journal (WSJ). 2020. How the WSG ranking of sustainably managed companies was compiled. Wall Street Journal. https://www.wsj.com/articles/how-the-wsj-ranking-of-sustainably-managed-companies-was-compiled-11602507053

Wang, F., Tokarska, K. B., Zhang, J., Ge, Q., Hao, Z., Zhang, X., & Wu, M. (2018). Climate Warming in Response to Emission Reductions Consistent with the Paris Agreement. *Advances in Meteorology*, 1–9. https://doi.org/10.1155/2018/2487962

Whieldon, E. (2018, Nov 13). European oil, gas companies ahead of peers on climate transition, reports find. *SNL Energy Finance Daily* Retrieved from https://search.proquest.com/docview/2133078864?accountid=11752

Whieldon, E. (2020). Biden plan to make companies disclose climate risks key to decarbonization. S&PGlobal. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/biden-plan-to-make-companies-disclose-climate-risks-key-to-decarbonization-60975902

White, L. J. (2010). Markets: The credit rating agencies. The Journal of Economic Perspectives, 24(2), 211-226. doi:http://dx.doi.org.proxy1.library.jhu.edu/10.1257/jep.24.2.211

World Economic Forum (WEF). (2020). Embracing the New Age of Materiality: Harnessing the Pace of Change in ESG. https://www.weforum.org/whitepapers/embracing-the-new-age-of-materiality-harnessing-the-pace-of-change-in-esg

World Economic Forum (WEF). ESG Ecosystem Map. (2019). https://widgets.weforum.org/esgecosystemmap/#/data-providers-market

World Meteorological Organization. (2020). 2020 on track to be one of the three warmest years on record. https://public.wmo.int/en/media/press-release/2020-track-be-one-of-three-warmest-years-record